इंटरनेट मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

"जानने का अधिकार, जीने का अधिकार"
Mazdoor Kisan Shakti Sangathan
"The Right to Information, The Right to Live"

"पुराने को छोड नये के तरफ"
Jawaharlal Nehru
"Step Out From the Old to the New"

IS 15806 (2008): Combine-harvester-thresher - Selected performance and other characteristics - Recommendations [FAD 21: Farm Implements and Machinery]

"ज्ञान से एक नये भारत का निर्माण"
Satyanarayan Gangaram Pitroda
"Invent a New India Using Knowledge"

Act Number 22 of 2005
The Indian Parliament
RIGHT TO INFORMATION

Made Available By
Public.Resource.Org

"ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है"
Bhartṛhari—Nītiśatakam
"Knowledge is such a treasure which cannot be stolen"

BLANK PAGE

BRUTUM FULMEN

IGNORANTIA JURIS NON EXCUSAT

PROTECTED BY COPYRIGHT

भारतीय मानक

कम्बॉईन-हारवेस्टर-गहाई मशीन — चुनिंदा कार्यकारिताएँ एवं अन्य मापदण्ड — अनुशंसाएँ

Indian Standard

COMBINE-HARVESTER-THRESHER — SELECTED PERFORMANCE AND OTHER CHARACTERISTICS — RECOMMENDATIONS

ICS 65.060.50

© BIS 2008

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

July 2008 **Price Group 4**

Farm Implements and Machinery Sectional Committee, FAD 21

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Farm Implements and Machinery Sectional Committee had been approved by the Food and Agriculture Division Council.

Combine-harvester-thresher, commonly known as combine, is being increasingly used, for a combination of operations, such as harvesting, threshing, separating, and cleaning of various crops grown in the country. Though test methodology and related terminology for testing combine-harvester-threshers have been extensively covered in IS 8122 (Part 1) : 1994 'Test code for combine-harvester-thresher: Part 1 Terminology (*first revision*)' and IS 8122 (Part 2) : 2000 'Combine-harvester-thresher — Test code: Part 2 Performance test (*first revision*)', a need has been felt to stipulate limits of some of the selected performance and other characteristics which are important from the functional and safety point of view to assess the performance and safety features of the machine.

In the formulation of this standard, considerable assistance has been derived from Northern Region Farm Machinery Training and Testing Institute, Hissar.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value, should be the same as that of the specified value in this standard.

Indian Standard

COMBINE-HARVESTER-THRESHER — SELECTED PERFORMANCE AND OTHER CHARACTERISTICS — RECOMMENDATIONS

1 SCOPE

This standard covers tolerances on the selected performance characteristics declared by the manufacturers and specifies minimum requirements for selected performance and other characteristics of the combine-harvester-thresher.

2 REFERENCES

The following standards contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
6024 : 1983	Specification for guards for harvesting machines (*first revision*)
6025 : 1982	Specification for knife sections for harvesting machines (*first revision*)
6283	Tractors and machinery for agriculture and forestry, powered lawn and garden equipment — Symbols for operator controls and other displays:
(Part 1) : 1998/ ISO 3767-1: 1991	Common symbols (*first revision*)
(Part 2) : 1998/ ISO 3767-2 : 1991	Symbols for agricultural tractors and machinery
8122	Test code for combine-harvester-thresher:
(Part 1) : 1994	Terminology (*first revision*)
(Part 2) : 2000	Performance tests (*first revision*)
10273 : 1987	Guidelines for declaration of power and specific fuel consumption labeling of agricultural tractors (*first revision*)
10378 : 1982	Specification for knife back for harvesting machines
12180	Tractors and machinery for agriculture and forestry — Noise measurement — Method of test:
(Part 1) : 2000	Noise at the operator's position — Survey method
(Part 2) : 2000	Noise emitted when in motion

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 8122 (Part 1) shall apply.

4 CHARACTERISTICS

Some of the selected performance characteristics of the combine harvesters along with tolerances with respect to the declared performance values/ specifications value and in certain cases the requirements are given in Table 1. It is recommended that if engine of a combine harvester has already been tested by recognized independent testing institute and its setting has not been changed while using on the combine, then bench testing of the engine should not be done and only the performance of the combine with such engine as its prime mover should be tested.

Table 1 Selected Performance and Other Characteristics of the Combine Harvesters

(*Clause* 4)

Sl. No. (1)	Characteristics (2)	Requirements (3)	Tolerance in Percent (4)	Remarks (5)
i)	*Prime Mover Performance*:			
a)	Maximum power (absolute) — Average maximum power observed during two hours, *Max* power test under natural ambient conditions, kW	To be declared by the manufacturer	-5	—
b)	Maximum power observed during the test after adjusting the no load engine speed as per recommendation of the manufacturer for field work, kW		–5	—
c)	Power at rated engine speed, kW		–5	IS 8122 (Part 2)
d)	Specific fuel consumption corresponding to average maximum power under 2 h maximum power test, g/kWh	-do-	± 5	—
e)	Maximum smoke density at 80 percent load between the speed at maximum power and 55 percent of speed at maximum power or 1 000 rpm whichever is higher	As per CMV rules	—	—
f)	Maximum crank shaft torque observed during the test after no load engine speed is adjusted as per manufacturers recommendation for field works, Nm	To be declared by the manufacturer	–8	—
g)	Back-up torque, percent	7 percent, *Min*	—	—
h)	Maximum operating temperatures °C:	To be declared by the manufacturer	—	The declared value should not exceed the maximum safe value specified by the oil company
	1) Engine oil	do		
	2) Coolant	do		
j)	Lubricating oil consumption	1 percent of specific fuel consumption at maximum power (high ambient)	+10 percent	The value would be based on the test conducted under high ambient conditions (5 h rating test)
ii)	*Brake Performance*:			
a)	Maximum stopping distance at a force equal to or less than 600 N on brake pedal (m)	10 m or as per requirements of CMVR	—	—
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/sec^2	$\leq$ 600 N	—	—
c)	Whether parking brake is effective at a force of 600 N at foot pedal(s), or 400 N at hand lever	Yes/No	—	Based on the test conducted Yes/No as applicable should be indicated
iii)	*Mechanical Vibration* (*Amplitude of Vibration*) *at*:			
a)	Operator's platform	120 µm, *Max*	—	—
b)	Steering wheel	150 µm, *Max*	—	—
c)	Seat (with driver seated)	120 µm, *Max*	—	—
iv)	*Air Cleaner Oil Pullover*:			
	Maximum percentage of oil pullover	0.25 percent, *Max*	—	—
v)	*Noise Measurement*:			
a)	Maximum ambient noise emitted by the combine dB(A)	As per CMVR	—	As per IS 12180 (Part 2)
b)	Maximum noise at operator's ear level dB(A)	As per CMVR	—	As per IS 12180 (Part 1)
vi)	*Discard Limit of*:			
a)	Cylinder bore diameter	To be specified by the manufacturer	—	—
b)	Piston diameter	do	—	—
c)	Ring end gap	do	—	—
d)	Ring grove clearance	do	—	—
e)	Diametrical and axial clearance of main bearing	do	—	—
f)	Diametrical and axial clearance of big end bearing	do	—	—
g)	Thickness of brake lining	do	—	—
h)	Thickness of clutch plate	do	—	—
vii)	*Field Performance*:	do		
a)	Suitability for the crops	Wheat and paddy (Essential)	—	—
b)	Grain breakage in the grain tank	$\leq$ 2.5 percent	—	—

Table 1 (*Concluded*)

Sl. No. (1)	Characteristics (2)	Requirements (3)	Tolerance in Percent (4)	Remarks (5)
	c) Non-collectable losses	≤ 2.5 percent for wheat paddy and gram and ≤ 4.0 percent for Soya bean	—	—
	d) Threshing efficiency	≥ 98 percent for wheat and paddy	—	—
	e) Cleaning efficiency	≥ 96 percent for wheat as well as paddy	—	—
viii)	*Safety Requirements*:			
	a) Guards against all moving parts/drives and hot parts	Essential	—	—
	b) Lighting arrangement	As per CMVR	—	—
	c) Grain tank cover	Essential	—	—
	d) Spark arrester in engine exhaust	Essential	—	—
	e) Stone trap before concave	Essential	—	—
	f) Rearview mirror	Essential	—	—
	g) Slip clutch at following drives: 1) Cutting platform auger drive 2) Under shout conveyor drive 3) Grain and tailing elevator drive	Essential	—	—
	h) Anti-slip surfaces at operators platform and ladder and proper gripping for control levers	Essential	—	—
	j) Working clearance around the controls	70 mm, *Min*	—	—
	k) Labelling of controls, gauges	Essential	—	As per IS 6283 (Parts 1 and 2)
ix)	*Material of Construction*:			
	Guards, knife blades and knife back	—	—	Conform to IS 6024, IS 6025 and IS 10378 respectively
x)	Labelling of combine harvester	Essential	—	As per IS 10273
xi)	Break-down (critical major and minor)	—	—	*See* Annex A

ANNEX A

[*Table* 1, *Sl No.* (xi)]

BREAK-DOWNS/DEFECTS

A-1 CRITICAL BREAK-DOWN/DEFECT

No critical break-down should occur during the course of test.

CATEGORIES OF BREAK-DOWN/DEFECT

(Self Propelled Combine)

Code No. (1)	Aggregate (2)	Critical Defects (3)	Sub-assembly/Part (4)
C-1	Engine	Engine seizure	Piston liner
C-2	do	do	Main/Big end bearing
C-3	do	Breakage of	Piston
C-4	do	do	Connecting rod
C-5	do	do	Crankshaft
C-6	do	do	Lubricating oil pump
C-7	do	do	Fuel injection pump
C-8	do	do	Governor

Code No. (1)	Aggregate (2)	Critical Defects (3)	Sub-assembly/Part (4)
C-9	Engine	Breakage of	Cylinder blocks
C-10	do	do	Cylinder head
C-11	do	do	Timing gears
C-12	do	do	Valves
C-13	do	do	Cam shaft
C-14	Transmission	do	Clutch housing
C-15	do	do	Gearbox housing/Transmission gears
C-16	do	do	Axle housing
C-17	Steering system	do	Steering ram cylinder
C-18	do	do	Steering shaft
C-19	do	do	Steering wheel
C-20	Brake systems	do	Actuating linkage parts
C-21	do	do	Brake pedal
C-22	Front axle	do	Front axle
C-23	Rear axle	do	Rear axle
C-24	do	do	Rear axle support
C-25	do	do	Pivot pin and k lock
C-26	do	do	Hydraulic cylinder
C-27	do	do	Radius rod
C-28	Wheel equipment	do	Wheel rim
C-29	do	do	Wheel disc
C-30	do	do	Wheel bolts
C-31	Cutting platform auger	do	Ammeter
C-32	do	do	Auger shaft
C-33	Threshing drum	do	Drum
C-34	Blower	do	Blower shaft
C-35	Header transport trailer	do	Axle
C-36	do	do	Frame
C-37	do	do	Wheel rim
C-38	do	do	Wheel disc
C-39	do	do	Wheel bolts
C-40	Hydraulic system	do	Distributor
C-41	do	do	Hydraulic pump

A-2 MAJOR BREAK-DOWN/DEFECT

The total major break-downs should not be more than three in numbers and neither of them should be of repetitive in nature.

CATEGORIES OF MAJOR DEFECTS

(Self Propelled Combine)

Code No. (1)	Aggregate (2)	Major Defects (3)	Sub-assembly/Part (4)
Mj-1	Engine	Breakage/crackage of	Fan blade
Mj-2	do	do	Oil pump
Mj-3	do	do	Water pump
Mj-4	do	do	Fuel tank
Mj-5	do	do	Radiator
Mj-6	Transmission	do	Clutch assembly
Mj-7	do	do	All gearing elements/Belts chain drive
Mj-8	do	do	All shaft elements
Mj-9	do	do	All bearings
Mj-10	do	do	Gear shifting forks
Mj-11	Brake system	do	Brake shoe/disc
Mj-12	Hydraulic system	do	Ram cylinder/piston
Mj-13	do	do	Hydraulic pump gears

Code No. (1)	Aggregate (2)	Major Defects (3)	Sub-assembly/Part (4)
Mj-14	Wheel assembly	Breakage/crackage of	Wheel bearings
Mj-15	Rear assembly	do	Tyne bar
Mj-16	do	do	Eccentric ring and roller
Mj-17	do	do	Slip clutch
Mj-18	do	do	Support arms
Mj-19	Cutter bar	do	Crank arm
Mj-20	do	do	Pitman shaft
Mj-21	Cutting platform auger	do	Auger
Mj-22	do	Crackage	Auger shaft
Mj-23	do	Breakage/crackage	Header lock
Mj-24	Threshing cylinder	do	Rasp bars
Mj-25	do	do	Bearings
Mj-26	do	do	Slip clutch
Mj-27	Concave	do	Concave bars
Mj-28	Rear beaters	do	Bearings
Mj-29	Straw walkers	do	Rack
Mj-30	do	do	Crank
Mj-31	do	do	Bearings
Mj-32	Stepped grain pan	do	Frame
Mj-33	Top sieve	do	Pitman shaft
Mj-34	do	do	Oscillation levers
Mj-35	do	do	Bearing
Mj-36	Bottom sieve	do	Pitman shaft
Mj-37	do	do	Oscillation levers
Mj-38	do	do	Bearings
Mj-39	do	do	Blades
Mj-40	do	do	Bearings
Mj-41	Bottom grain conveyor	do	Screws
Mj-42	do	do	Bearings
Mj-43	Grain elevator	do	Drive shaft
Mj-44	do	do	Bearings
Mj-45	Upper grain auger	Breakage/crackage of	Screws
Mj-46	do	do	Bearings
Mj-47	Bottom tailing auger	do	Screws
Mj-48	do	do	Bearings
Mj-49	Upper tailing auger	do	Screws
Mj-50	do	do	Bearings
Mj-51	do	do	Drive shaft
Mj-52	Grain tank	do	Sheet metal
Mj-53	Grain conveying auger	do	Screws
Mj-54	do	do	Bearings
Mj-55	Grain unloding auger	do	Screws
Mj-56	do	do	Bearings
Mj-57	Seat	do	Body
Mj-58	System waring gauges	Malfunctioning	Water temperature
Mj-59	do	do	Engine oil pressure
Mj-60	do	do	Ammeter
Mj-61	Operating levers	Breakage of	Hard accelerator
Mj-62	do	do	Header assembly raising lowering lever
Mj-63	do	do	Reel raising/Lowering lever
Mj-64	do	do	Travel speed variation control lever
Mj-65	do	do	Main gear shifting lever
Mj-66	do	do	Threshing drum speed variator control lever
Mj-67			Concave clearance adjusting lever
Mj-68	do	do	Parking brake lever
Mj-69	do	do	Threshing and cleaning unit drive lever
Mj-70	do	do	Cutting and cleaning unit drive lever
Mj-71	do	do	Unloading auger engaging lever

A-3 MINOR BREAK-DOWN/DEFECT

The minor break-downs should not be more than five and should not be repetitive (more than three times during the course of test).

CATEGORIES OF MINOR DEFECTS

(Self Propelled Combine)

Code No. (1)	Aggregate (2)	Minor Defects (3)	Sub-assembly/Part (4)
Min-1	Engine	Leakage from	Radiator joints
Min-2	do	do	Gaskets
Min-3	do	do	Seals
Min-4	do	do	O rings
Min-5	do	Burst/cracked	High pressure pipe
Min-6	do	Malfunctioning	Fuel injector
Min-7	Transmission	Leakage from	Gaskets
Min-8	do	do	Seals
Min-9	Steering system	do	Gaskets
Min-10	do	do	Seals
Min-11	do	do	O Rings
Min-12	Hydraulic brake system	do	Gaskets
Min-13	do	do	Seals
Min-14	do	do	O Rings
Min-15	Reel assembly	Breakage/crackage of	Spring tynes
Min-16	Cutter bar assembly	do	Knife guard
Min-17	do	do	Knife guard
Min-18	Cutting platform auger	do	Retractable fingers
Min-19	Undershot conveyor	do	Chain
Min-20	do	do	Comb bar
Min-21	Threshing drum	Breakage of	Pegs/Rasp bars
Min-22	do	do	Hub plates
Min-23	Concave	do	Concave bars
Min-24	do	do	Pegs
Min-25	do	do	Extension bars
Min-26	Rear beaters	do	Beater bars
Min-27	Straw walkers	Bending of	Rack
Min-28	do	do	Crank
Min-29	do	do	Sheet metal
Min-30	do	do	Serrations
Min-31	Stepped grain pan	Breakage of	Rods
Min-32	Top sieve	Bending of	Lips
Min-33	Bottom sieve	do	Lips
Min-34	do	do	Frame
Min-35	Grain elevator	Breakage of	Chain
Min-36	do	do	Pads
Min-37	Upper grain auger	Bending of	Screw
Min-38	do	do	Sprockets
Min-39	Bottom tailing auger	do	Screw
Min-40	do	Breakage of	Chain
Min-41	do	do	Sprocket
Min-42	Tailing elevator	do	Chain
Min-43	do	do	Sprocket
Min-44	do	do	Pads
Min-45	Upper tailing auger	Bending of	Screw
Min-46	do	do	Drive shaft
Min-47	do	Breakage of	Chain
Min-48	do	do	Sprocket
Min-49	Grain tank	do	Welded joints
Min-50	do	Bending of	Agitator
Min-51	Grain conveying auger	do	Screw
Min-52	do	Breakage of	Chain
Min-53	Grain unloading auger	Bending of	Screw
Min-54	do	do	Drive shaft

Code No. (1)	Aggregate (2)	Minor Defects (3)	Sub-assembly/Part (4)
Min-55	Switches/controls	Malfunctioning	Grain tank light switch
Min-56	do	do	Work light switch
Min-57	do	do	Head light switch
Min-58	do	do	Starting switch
Min-59	do	do	Tail light switch
Min-60	do	do	Battery charging lamp
Min-61	do	do	Horn push button
Min-62	do	do	Hazard light switch
Min-63	do	do	Side indicator light switch
Min-64	do	do	Speedometer
Min-65	Levers	Bending of	All control levers
Min-66	Seat	Breakage of	Suspension
Min-67	Electrical	Malfunctioning of	Starter Motor
Min-68	do	do	Dynamo/Alternator
Min-69	do	do	Voltage regulator

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act*, 1986 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Director (Publications), BIS.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards : Monthly Additions'.

This Indian Standard has been developed from Doc : No. FAD 21 (1650).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters :

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110 002
Telephones : 2323 0131, 2323 3375, 2323 9402

Telegrams : Manaksanstha
(Common to all offices)

Regional Offices : Telephone

Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg
NEW DELHI 110 002
2323 7617
2323 3841

Eastern : 1/14 C.I.T. Scheme VII M, V. I. P. Road, Kankurgachi
KOLKATA 700 054
2337 8499, 2337 8561
2337 8626, 2337 9120

Northern : SCO 335-336, Sector 34-A, CHANDIGARH 160 022
260 3843
260 9285

Southern : C.I.T. Campus, IV Cross Road, CHENNAI 600 113
2254 1216, 2254 1442
2254 2519, 2254 2315

Western : Manakalaya, E9 MIDC, Marol, Andheri (East)
MUMBAI 400 093
2832 9295, 2832 7858
2832 7891, 2832 7892

Branches : AHMEDABAD. BANGALORE. BHOPAL. BHUBANESHWAR. COIMBATORE. FARIDABAD. GHAZIABAD. GUWAHATI. HYDERABAD. JAIPUR. KANPUR. LUCKNOW. NAGPUR. PARWANOO. PATNA. PUNE. RAJKOT. THIRUVANANTHAPURAM. VISAKHAPATNAM.

Printed by Sunshine Graphics